Abstract

A method and apparatus (10) for determining a best focus position of an object (30) relative to a reference position (e.g., axis A) of a dark-field optical imaging system (20), with an effective focusing range up to 10 times of the depth of field of the system. The method includes the steps of first forming a dark-field image of the object at different focus positions (z_m). Each dark-field image has a corresponding image intensity distribution with an average intensity and a variance of intensity. The next step is forming a set of contrast values by calculating a contrast value (C_m) for each dark-field image based on the variance and the average intensity. The last step is determining the best focus position by fitting a Lorentzian function to the set of contrast values plotted as a function of the different focus positions and identifying the focus position associated with the maximum contract value (C_{max}). The second step includes digitizing each dark-field image such that the image intensity distribution for each the dark-field image is a digitized image intensity distribution comprising discrete gray-scale intensity levels (I_n) corresponding to a discrete plurality of n pixels, and then arranging each the digitized image intensity distribution into a histogram ($H(I_n)$) of an amount of the pixels having a given the gray-scale intensity level (I_n).